

IN THE CLAIMS:

1-47. (Canceled)

48. (Previously presented) A mutagenized bovine gamma-II-crystallin polypeptide with a new binding activity towards a binding partner, wherein amino acids on a surface of a bovine gamma-II-crystallin of SEQ ID NO: 22 is mutagenized, and further wherein:
- the amino acids that are mutagenized are selected from the group consisting of Lys 3, Thr 5, Tyr 7, Cys 16, Glu 18, Ser 20, Arg 37, and Asp 39 of the bovine gamma-II-crystallin of SEQ ID NO: 22;
 - said beta-sheet, said beta-strands, and said amino acids are located on a surface of said gamma-crystallin polypeptide and are thus accessible to a solvent or a binding partner; and
 - the mutagenizing is selected from the group consisting of an insertion, a deletion, a substitution, and combinations thereof, such that the mutagenized gamma-crystallin polypeptide has a new binding activity towards a binding partner, with the proviso that the gamma-crystallin polypeptide without substitution, deletion, insertion, or combinations thereof has no binding activity at the surface of the beta-sheet structure wherein the amino acids are mutagenized, and after substitution, deletion, insertion, or combinations thereof at the surface of the beta-sheet structure, the gamma-crystallin polypeptide has a new binding activity towards a binding partner.
49. (Previously presented) The mutagenized bovine gamma-II-crystallin of claim 48, wherein the mutagenized bovine gamma-II-crystallin has a new antigen binding specificity for a compound selected from the group consisting of estradiol and BSA- β -estradiol-17-hemisuccinate, and further wherein the protein has an amino acid sequence comprising one of SEQ ID NO: 19 and SEQ ID NO: 21.
50. (Canceled)

51. (Previously presented) The mutagenized gamma-crystallin polypeptide of claim 50, wherein each amino acid substitution occurs at an amino acid selected from the group consisting of Lys 3, Thr 5, Tyr 7, Cys 16, Glu 18, Ser 20, Arg 37, and Asp 39 of the bovine gamma-II-crystallin of SEQ ID NO: 22.
52. (Previously presented) The mutagenized gamma-crystallin polypeptide of claim 51, wherein the mutagenized gamma-crystallin polypeptide is present in a library of mutagenized gamma-crystallin polypeptides, and further wherein different members of the library comprise different amino acid substitutions at one or more amino acids selected from the group consisting of Lys 3, Thr 5, Tyr 7, Cys 16, Glu 18, Ser 20, Arg 37, and Asp 39 of the bovine gamma-II-crystallin of SEQ ID NO: 22.
53. (Previously presented) The mutagenized gamma-crystallin polypeptide of claim 52, wherein the library is a phage display library and the mutagenized gamma-crystallin polypeptide is displayed on by the phage.
- 54-57. (Canceled)

Please add the following new claims:

58. (New) A recombinant mutagenized vertebrate gamma-II-crystallin polypeptide, wherein relative to a reference vertebrate gamma-II-crystallin polypeptide the recombinant mutagenized gamma-II-crystallin polypeptide comprises between 1 and 8 amino acid substitutions, and further wherein the 1 to 8 amino acids that are substituted are located in two or three beta-strands of one or two beta-sheets of the vertebrate gamma-II-crystallin.
59. (New) The recombinant mutagenized gamma-II-crystallin polypeptide of claim 58, wherein the amino acids that are substituted are selected from the group consisting of Lys 3, Thr 5, Tyr 7, Cys 16, Glu 18, Ser 20, Arg 37, and Asp 39 of

the gamma-II-crystallin of SEQ ID NO: 22 or the amino acids in these same positions in another vertebrate gamma-II-crystallin.

60. (New) The mutagenized gamma-II-crystallin polypeptide of claim 58, wherein the mutagenized gamma-II-crystallin polypeptide is present in a library of mutagenized gamma-II-crystallin polypeptides, and further wherein different members of the library comprise different amino acid substitutions at one or more amino acids selected from the group consisting of Lys 3, Thr 5, Tyr 7, Cys 16, Glu 18, Ser 20, Arg 37, and Asp 39 of the gamma-II-crystallin of SEQ ID NO: 22 or the amino acids in these same positions in another vertebrate gamma-II-crystallin.
61. (New) The mutagenized gamma-II-crystallin polypeptide of claim 60, wherein the library is a phage display library and the mutagenized gamma-II-crystallin polypeptide is displayed by the phage.
62. (New) A mutagenized gamma crystallin polypeptide, wherein one or more amino acids on a surface of the gamma crystallin polypeptide and located in two or three beta-strands of one or two beta-sheets of said gamma-II-crystallin polypeptide are substituted.
63. (New) The mutagenized gamma crystallin polypeptide of claim 62, wherein the mutagenized gamma crystallin polypeptide is a mutagenized gamma-II-crystallin polypeptide.
64. (New) The mutagenized gamma-II-crystallin polypeptide of claim 63, wherein the mutagenized gamma-II-crystallin polypeptide comprises at least one amino acid substitution in each of three beta-strands of the N-terminal beta-sheet relative to the wild-type gamma-II-crystallin polypeptide upon which the mutagenized gamma-II-crystallin polypeptide is based.

65. (New) The mutagenized gamma-II-crystallin polypeptide of claim 64, wherein the mutagenized gamma-II-crystallin polypeptide comprises at least one amino acid substitution at an amino acid position selected from the group consisting of Lys 3, Thr 5, Tyr 7, Cys 16, Glu 18, Ser 20, Arg 37, and Asp 39 of the gamma-II-crystallin of SEQ ID NO: 22 or the amino acids in these same positions in another vertebrate gamma-II-crystallin.
66. (New) The mutagenized gamma-II-crystallin polypeptide of claim 64, wherein the mutagenized gamma-II-crystallin polypeptide comprises at least three amino acid substitutions at amino acid positions selected from the group consisting of Lys 3, Thr 5, Tyr 7, Cys 16, Glu 18, Ser 20, Arg 37, and Asp 39 of the gamma-II-crystallin of SEQ ID NO: 22 or the amino acids in these same positions in another vertebrate gamma-II-crystallin.
67. (New) The mutagenized gamma-II-crystallin polypeptide of claim 64, wherein the mutagenized gamma-II-crystallin polypeptide comprises at least five amino acid substitutions at amino acid positions selected from the group consisting of Lys 3, Thr 5, Tyr 7, Cys 16, Glu 18, Ser 20, Arg 37, and Asp 39 of the gamma-II-crystallin of SEQ ID NO: 22 or the amino acids in these same positions in another vertebrate gamma-II-crystallin.
68. (New) The mutagenized gamma-II-crystallin polypeptide of claim 64, wherein the mutagenized gamma-II-crystallin polypeptide comprises amino acid substitutions at each amino acid position selected from the group consisting of Lys 3, Thr 5, Tyr 7, Cys 16, Glu 18, Ser 20, Arg 37, and Asp 39 of the gamma-II-crystallin of SEQ ID NO: 22 or the amino acids in these same positions in another vertebrate gamma-II-crystallin.